Army Service Forces
Quartermaster Corps
CLIMATIC RESEARCH LABORATORY
Lawrence, Massachusetts

...ly Report - 1 February 1945

1. The following reports have been sent to the Office of The Quartermaster General for the approval of Colonel Georges F. Doriot:

Report No. 145 - 15 January 1945
Lighters, Individual
Utility and Performance under Various Ambient Conditions
Thirteen Tables and Fifteen Figures

A study was made of the performance under controlled laboratory conditions of the following commercial or experimental cigarette lighters:

Ronson, Whirlwind
Bowers, Sure Fire
Bowers, Army-Navy
Zippo
Match King
OQMG, Experimental, Type 1

The test conditions included temperatures of minus 45°F., minus 20°F., 0°F., plus 10°F., and plus 30°F. in the Cold Room; temperatures of plus 90°F., relative humidity, 85 percent in the Jungle Chamber; temperature plus 110°F., relative humidity 33 percent; temperature plus 100°F., relative humidity 30 percent; temperature plus 94°F., relative humidity 32 percent in the Constant Temperature Room; and wind velocities of 10 and 16 mph. in the Wind Tunnel Room.

The Match King was unsatisfactory in most phases of this test. This lighter would not ignite in low ambient temperatures and due to poor machining had an excessive evaporative rate of fuel. The detachable striker may be easily lost. When this occurs, the lighter is rendered useless. This item was not considered suitable for field use.

The Bowers, Army-Navy model was incapable of igniting a pipe, cigar, wood fire, gasoline stove or solid fuel. The lighter was unhandy to carry, and the punk cord and snuffer-ball could be easily lost. The punk cord would not ignite when damp or when the charred tip was ruffled. The sum of these factors renders the Bowers, Army-Navy lighter unsuitable for military use.

The operating and efficiency characteristics of the Bowers, Sure Fire were satisfactory. The absence of rugged construction and the failure

to resist corrosion are the primary reasons for not recommending this lighter for field use.

The performance of the OQMG, Experimental lighter was satisfactory, except at low ambient temperatures. It is essentially waterproof and because of this feature, it had a low evaporative rate of fuel. On the other hand, waterproofing has been attained at the expense of convenience in size, design and weight. This lighter is bulky and not easy to carry, as judged by conventional items. In addition, the ignition wheel assembly is detachable during fueling and might be lost easily.

The Ronson, Whirlwind, with the telescopic windshield, offered the greatest resistance to wind. This lighter operated well on commercial lighter fluid, but possessed a high evaporative rate when regular gasoline was used. It operated satisfactorily only at the higher ambient temperatures. Mechanical operation was sluggish from 0°F. to plus 30°F. Ignitions could not be obtained below 0°F. This lighter, therefore, is not considered suitable for general field use.

The Zippo was the most satisfactory of the lighters studied. It functioned well in a wide range of ambient conditions and was operable with a mittened hand. It was easy to recondition after adverse usage and was superior to the other test items in regard to ease of maintenance. An ample supply of extra flints and wicks may be carried in the bottom of the fuel reservoir. However, this lighter had a high evaporative loss and is affected considerably by wind. The case of the Zippo might be strengthened in order to provide better resistance to field abuse.

Reports No. 131 and 157 - 27 January 1945
Parka and Trousers, Wet Weather
Comfort, Utility, Moisture Accumulation and Warmth During Exercise
Comparison of Vinyl Resin Coated and Buna S Coated
Eleven Tables and One Figure

The study included a comparison of vapor impermeable outer clothing, Parka and Trousers, Wet Weather and vapor permeable outer clothing, cotton trousers and field jacket. The items were worn by soldiers undergoing rigorous physical exercise in dry and wet cold. A comparison was also made of vinyl resin coated fabrics versus Buna S coated fabrics.

Exercise experiments were conducted on the treadmill in the Cold Room at an ambient temperature of plus 20°F. Each soldier carried a 40-pound pack. Rain protection was studied in the All Weather Chamber during a drizzle, an overhead rainfall of 4 inches per hour, and a driving rain of 4 inches per hour in the presence of a 20 mph. wind. Performance of the garments was also investigated in the field during rainy weather.

Sweat accumulation under the moisture impermeable garments is not serious during relatively short periods of wear, but it leads to an undesirable

clammy sensation. During 12 - 24 hour periods of wear, however, the sweat accumulation under the impermeable wet weather clothing may be sufficient to result in considerable discomfort for the wearer. This is especially true for soldiers engaged in strenuous activity.

There is no significant difference in warmth or rate of chilling during rest, between the permeable Jacket, Field, M-1943 and Trousers, Field, Cotton and the impermeable Parka and Trousers, Wet Weather.

The wet weather trousers give better rain protection than the Trousers, Field, Cotton. They have several disadvantages, however, most noteworthy of which are their stiffness, poor pant closures, absence of adequate pockets or means of access to underlying clothing, and absence of a fly. Furthermore, the trousers are so designed that it is virtually impossible to lower and replace them without removing the parka.

The wet weather parka gave only slightly better rain protection than the Jacket, Field, M-1943, worn with the Hood, Field, M-1943. The jacket was considered superior to the wet weather parka because of its greater flexibility, ease of ventilation and excellent pockets. The Parka was disliked for the reasons implied above and because it has an unpleasant odor when wet.

It is concluded that the wet weather parka and trousers are desirable items for use under conditions of extreme wetness and heavy rain by practically all troops and under conditions of moderate wetness by relatively inactive troops. The wet weather gear is more acceptable for wear by relatively inactive troops than by troops engaged in strenuous activity.

Garments coated with Buna S are preferred to the standard items coated with vinyl resin.

2. In the Provisional Reports, tests on the following items were discussed:

Poncho, Lightweight, Experimental Throat
Gloves, Work, Waterproof
Thermal Properties of Fabrics
Hand Calorimetry
Gloves, Mosquito
Jungle Uniforms
    Physiological Heat Load
    Drying Rate
    Skin Temperature Measurements by means of a Radiometer
Jackets, Field, Pile, Modified
Covers, Waterproof, Pistol

3. Report entitled "Tropical Clothing and Equipment, Including Rations QMB T-1450 (Selected Items)" submitted to the Quartermaster Board.

4. The Wet-Cold Field Trials have been in progress since the middle of January. Captain Marshall Clinton, Jr. is the Test Officer in Charge. All of the standard items listed in T/E 21 will be included in the test. A comprehensive study of tentage and storage of rations and equipment in dumps is also under way. Emphasis in testing in the field will be concentrated upon protection provided soldiers operating in wet cold.

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Commanding